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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/676,961

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Florence R. Pon

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01/13/2005

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EXAMINER

CHU, CHRIS C

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 01/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/676,961

Applicant(s)

PON ET AL.

Examiner

Chris C. Chu

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 November 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 30 is/are pending in the application.
- 4a) Of the above claim(s) 3 - 5 and 11 - 30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2 and 6 - 10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>12/9/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restriction

1. The previous restriction requirement improperly grouped the species/claims. The proper listing of species/claims should be:

- a) Species I – a staircase arrangement in one dimension, shown in figures 2A and 2B, to which claim 13 is drawn;
- b) Species II - a staircase arrangement in two dimensions, shown in figure 3, to which claim 14 is drawn;
- c) Species III – an alternate staggered arrangement in one dimension, shown in figures 4A and 4B, to which claim 15 is drawn; and
- d) Species IV – an alternate staggered arrangement in two dimensions, shown in figure 5, to which claim 16 is drawn.

Currently, claims 1, 2, 6-12 and 17-20 are generic to all species and claims 3-5 are generic to species II and IV.

Applicant elected the species of figure 2A (claim 13) and thus claim 13 along with generic claims 1, 2, 6-12 and 17-20 are herein examined. Claims 3-5 and 14-16 are withdrawn. Applicant argues that all figures belong to the same generic species. However, as pointed out above, the figures and their associated claims include mutually exclusive limitations and thus are independent. The arguments to the contrary are not persuasive; the requirement is still deemed proper and is therefore made FINAL.

Specification

2. The disclosure is objected to because of the following informalities:
- (a) Needs a summary of the invention because this application lacks a summary of the invention.
 - (b) The term “dies” should be --dice-- in the numerous pages of the specification.
- Appropriate correction is required.

Claim Objections

3. Claims 1, 2, 11, 12 and 16 – 20 are objected to because of the following informalities: the term “dies” should be --dice--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:
- The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
5. Claims 2 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 2, it is unclear what applicant regards as “the upper and lower conductors are separated by a conductor distance.”

In claim 12, it is unclear what applicant regards as “the conductors are separated by a conductor distance.”

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1, 2, 6 – 12 and 17 – 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Hung (U. S. Pat. No. 6,476,474).

Regarding claim 1, Hung discloses in e.g., Fig. 2F and column 3, line 34 – column 4, line 7 a method comprising:

- stacking an upper die (200) having an upper top surface and upper first, second, third, and fourth edges on top of a lower die (100) having a lower top surface and lower first, second, third, and fourth edges such that the upper first edge is displaced from the lower first edge by a first distance, the upper first and third edges being opposite to each other, the lower first and third edges being opposite to each other, the upper top surface (where the bond pads are located on the die 200) facing toward the lower top surface (where the bond pads are located on the die 100); and
- attaching the upper die (200) to the lower die (100) with an adhesive layer (220; column 4, lines 5 – 6) between the upper and lower dies (see Fig. 2F).

Regarding claims 2 and 12, Hung discloses in e.g., Fig. 2F and column 3, line 34 – column 4, line 7 further comprising: attaching upper (420) and lower (410) conductors to upper (210) and lower (110) bond pads of the upper (200) and lower (100) dies at the upper and lower

first edges, respectively, such that the upper and lower conductors are separated by a conductor distance.

Regarding claim 6, Hung discloses in e.g., Fig. 2F and column 3, line 34 – column 4, line 7 further comprising: attaching the lower die (100) to a substrate (330) by a second adhesive layer (120; column 3, line 66) deposited between the lower die and the substrate (see Fig. 2F).

Regarding claims 7 and 17, Hung discloses in e.g., Fig. 2F and column 3, line 34 – column 4, line 7 further comprising: depositing an upper redistribution layer (a layer that contains the bond pads 210 and provides electrical connections between the bond pads 210 and internal elements inside of the upper die 200; column 3, lines 43 – 47) to place bond pads (210) on the upper die (200).

Regarding claim 8, Hung discloses in e.g., Fig. 2F and column 3, line 34 – column 4, line 7 further comprising: depositing a lower redistribution layer (a layer that contains the bond pads 110 and provides electrical connections between the bond pads 110 and internal elements inside of the lower die 100; column 3, lines 38 – 42) to place bond pads (110) on the lower die (100).

Regarding claims 9 and 18, Hung discloses in e.g., Fig. 2F and column 3, line 34 – column 4, line 7 stacking the upper die (200) comprising stacking the upper die (200) on top of the lower die (100), the upper and lower die having same or “substantially” similar sizes.

Regarding claims 10 and 20, Hung discloses in e.g., Fig. 2F and column 3, line 34 – column 4, line 7 attaching comprising attaching the upper die (200) to the lower die (100) by the first adhesive layer (220) made of a non-conductive or conductive material. Furthermore, since adhesive layer must be made of either a non-conductive or conductive material, the claimed adhesive layer is held fully met by Hung.

Regarding claim 11, Hung discloses in e.g., Fig. 2F and column 3, line 34 – column 4, line 7 a method comprising:

- stacking a plurality of dies (100 and 200) on top of one another in a staggering configuration (page 4, section 0021; defined as be stair-case) such that an upper die (200) top surface (where the bond pads are located on the die 200) in a pair of adjacent dies (100 and 200) faces downward or upward and is displaced by a first distance with respect to a lower die in the pair; and
- attaching the adjacent dies (100 and 200) by an adhesive layer (220; column 4, lines 5 – 6) between the adjacent dies (see Fig. 2F).

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Masuda et al., Lin et al., Haba et al., Huang et al., Lee et al., Eskildsen, Tsai et al. and Michii disclose a stacked semiconductor package having shifted like stairs and not covering pads arrangement.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is 571-272-1724. The examiner can normally be reached on 11:30 - 8:00.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 517-272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chris C. Chu
Examiner
Art Unit 2815

c.c.
Monday, December 27, 2004


GEORGE ECKERT
PRIMARY EXAMINER